CLAIMS

1. A network node structure (105_i) for an optical communications network (100), comprising:

a housing (200) having a plurality of slots (205); and

a plurality of cards (210-245) inserted in the slots, wherein said plurality of cards includes:

at least one first card (210,215) having an optical input (310) for receiving an input WDM optical signal from an optical line (110_1,110_2) of the network, a first optical device (315) for extracting at least one component optical signal at a wavelength from the input WDM optical signal and at least one optical output (320_1-320_9) making available the at least one component optical signal;

at least one second card (220,225), separate from the first card, having at least one socket (405-420) mechanically and electrically adapted to receiving one of a plurality of interchangeable electro-optical components (500), each component having an optical input (505) adapted to receiving an input optical signal at a prescribed operating wavelength, an optical-to-electrical conversion unit (525) for converting the received optical signal into a corresponding converted electrical signal, an electrical output (515) making available the converted electrical signal, and an electrical input (520) adapted to receiving an input electrical signal, an electrical-to-optical conversion unit for converting the received electrical signal into a corresponding optical signal at

the prescribed operating wavelength, an optical output (510) making available the converted optical signal, a selected electro-optical component of said plurality of components being plugged into the socket and having an operating wavelength corresponding to the wavelength of the extracted component optical signal, an electronic circuitry (428) in bi-directional communication relationship with said at least one socket for treating the converted electrical signal provided by said selected electro-optical component;

at least one first optical waveguide (422_i) connected between the at least one optical output of the first card and the optical input of the selected electro-optical component, for feeding to the optical input of the selected electro-optical component the extracted component optical signal.

2. The network node structure according to claim 1, further comprising, on one of said plurality of cards, a second optical device (330) having at least two optical inputs (325_1-325_9), each one adapted to receiving a respective input optical signal comprising at least one component optical signal of an output WDM optical signal made available at an optical output (340) of the second optical device to the optical line (110_1,110_2) of the network, the second optical device combining the input optical signals into the output WDM optical signal, and

at least one second optical waveguide (422_o) connected between one of the at least two optical inputs of the second optical device and the optical output of

the selected electro-optical component, for delivering to the second optical device the component optical signal generated by the electro-optical conversion of the input electrical signal operated by the selected electro-optical component.

3. The network node structure according to claim 2, in which the input electrical signal is the converted electrical signal treated by the electronic circuitry.

4. The network node structure according to claim 2, in which the input electrical signal corresponds to a client signal of a local client of the network node.

5. The network node structure according to claim 2, in which:

the first optical device comprises an optical de-multiplexer (315) for de-multiplexing the input WDM optical signal into a plurality of component optical signals, the at least one optical output of the first card comprising a plurality of optical outputs each one making available one of the plurality of component optical signals, and

the second optical device comprises a multiplexer (330) for multiplexing the component optical signals into the output WDM optical signal, the at least two optical inputs of the second optical device comprising a plurality of optical inputs, each one being adapted to receiving a respective component optical signal.

6. The network node structure according to claim 2, in which said second optical device is provided on the first card.

7. The network node structure according to claim 2, in which said second optical device is provided on a third card distinct from the first and second cards.

8. The network node structure according to claim 2, in which said optical line of the network includes a first optical line (110_1) coupled to the optical input of the first card and a second optical line (110_2) coupled to the optical output of the second optical device.

9. The network node structure according to claim 1, in which said electronic circuitry comprises circuits adapted to regenerating the converted electrical signal.

10. The network node structure according to claim 9, in which said circuits are adapted to performing at least 2R signal regeneration, particularly 3R signal regeneration.

11. The network node structure according to claim 1, in which the interchangeable electro-optical components are hot pluggable/unpluggable into/from the at least one socket of the second card.

12. The network node structure according to claim 11, in which said interchangeable electro-optical

components are electro-optical transceivers complying with the MultiSource Agreement (MSA), particularly Small Form Factor Pluggable (SFP) or 10 Gigabit Small Form Factor Pluggable (XFP) transceivers.

13. The network node structure according to claim 1, in which said second card has at least a second socket, a selected second electro-optical component of said plurality of components being plugged into the second socket and receiving/transmitting electrical signals from/to the selected electro-optical component plugged in the first socket, an optical link (422_o,422_i) being further provided between the second electro-optical component and a client (115;103_1-130_4) of the network node.

14. The network node structure according to claim 13, in which said second electro-optical component has an operating optical wavelength corresponding to that of a selected one of the component optical signals.

15. The network node structure according to claim 13, in which said second electro-optical component has an operating optical wavelength different from those of the component optical signals.

16. The network node structure according to claim 1, in which said at least one second card further includes a configurable electronic switch (425) for routing the converted electrical signal received from the at least

one socket towards the electronic circuitry and for routing the converted electrical signal treated by the electronic circuitry towards the at least one socket.

17. The network node structure according to claim 16, in which said at least one second card also includes a control unit (435) controlling the configurable electronic switch.

18. The network node structure according to claim 17, in which the second card comprises an electrical connections arrangement between the control unit and the socket, and in which the control unit is capable of detecting the presence of an electro-optical component in the socket and to automatically configure the electronic switch according to one of a number of predetermined switch configuration patterns.

19. The network node structure according to claim 17, in which the electronic circuitry is capable of monitoring characteristic parameters of the converted electrical signal so as to assess a level of communication performances, said characteristic parameters being communicated to the control unit.

20. The network node structure according to claim 1, in which the electronic circuitry of the at least one second card further includes an electrical multiplexing/de-multiplexing electronic component, adapted to receive two or more converted electrical

signals at a first bit rate, coming from corresponding sockets, to multiplex the two or more converted electrical signals into an aggregated electrical signal at a second bit rate higher than the first bit rate, to be provided to a corresponding socket, and, dually, adapted to receive an electrical signal at the second bit rate and to de-multiplex it into two or more electrical signals at the first bit rate.

21. An optical communications network (100) comprising at least one network node,

characterized in that

the network node has a structure according to any one of the preceding claims.